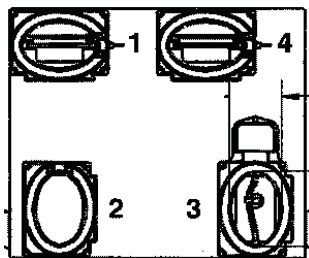


# Installation Instructions

**NOTE:** Read the entire instruction manual before starting the installation.

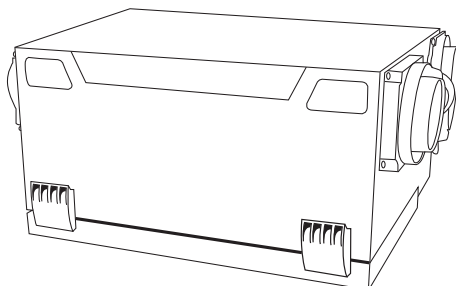
## TABLE OF CONTENTS

	PAGE
SAFETY CONSIDERATIONS .....	1
INTRODUCTION .....	1
INSTALLATION CONSIDERATIONS .....	2
COMPONENT DESCRIPTION .....	2
UNIT INSTALLATION .....	2
WALL CONTROL .....	4
OPERATING THE ERV/HRV WITH THE EVOLUTION CONTROL .....	5
ELECTRICAL CONNECTIONS .....	6
ACCESSORIES .....	6
BALANCING ERV/HRV .....	7
VENTILATION EVALUATION .....	8
CONTROL BOARD OPERATION .....	8
CARE AND MAINTENANCE .....	8
TROUBLESHOOTING .....	9



1. Fresh air to building port
2. Exhaust air from building port
3. Fresh air from outside port
4. Exhaust air to outside port

**Fig. 1 - ERV/HRV Unit (Top Port)**



**Fig. 2 - ERV/HRV Unit (Side Port)**

A08103


A05330

## SAFETY CONSIDERATIONS

Installation and servicing of this equipment can be hazardous due to mechanical and electrical components. Only trained and qualified personnel should install, repair, or service this equipment.

Untrained personnel can perform basic maintenance functions such as cleaning and replacing air filters. All other operations must be performed by trained service personnel. When working on this equipment, observe precautions in the literature, on tags, and on labels attached to or shipped with the unit and other safety precautions that may apply.

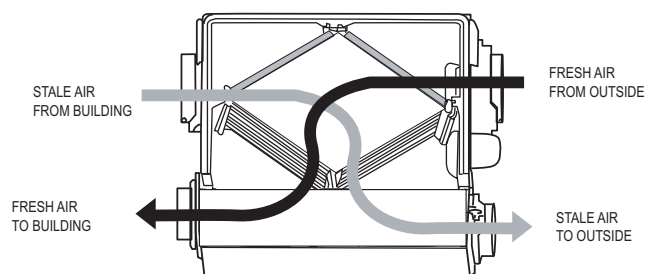
Follow all safety codes. Installation must be in compliance with local and national building codes. Wear safety glasses, protective clothing, and work gloves. Have fire extinguisher available. Read these instructions thoroughly and follow all warnings or cautions included in literature and attached to the unit.

Recognize safety information. This is the safety-alert symbol . When you see this symbol on the unit and in instructions or manuals, be alert to the potential for personal injury.

Understand these signal words; DANGER, WARNING, and CAUTION. These words are used with the safety-alert symbol. DANGER identifies the most serious hazards which **will** result in severe personal injury or death. WARNING signifies hazards which **could** result in personal injury or death. CAUTION is used to identify unsafe practices which **may** result in minor personal injury or product and property damage. NOTE is used to highlight suggestions which **will** result in enhanced installation, reliability, or operation.

## INTRODUCTION

The Energy/Heat Recovery Ventilator (ERV/HRV) is used to exchange indoor stale air with outside fresh air. The unit is equipped with a special energy/heat recovery core which transfers both sensible and/or latent heat between the fresh incoming air and stale exhaust air. The cross-flow design core allows entering and leaving air streams to transfer heat and/or latent energy without mixing (See Fig. 3).



**Fig. 3 - ERV/HRV Airflow During Air Exchange  
(Bottom view with access door removed)**

A07460

The model operates at 2 airflows, 50 CFM in low speed and 100 CFM in high speed. This unit comes in two configurations, vertical or horizontal. Special attention should be given to duct application, balancing the ERV/HRV, and locating unit for easy access and routine maintenance.

## INSTALLATION CONSIDERATIONS

### Inspect Equipment

Move carton to final installation location. Remove ERV/HRV from carton taking care not to damage unit. Remove all packaging and inspect unit for damage. Remove parts bag from inside unit. File claim with shipping company if shipment is damaged or incomplete. Check to make sure ERV/HRV unit matches Fig. 1 or Fig. 2.

### Select Location

The ERV/HRV **should be located in a conditioned space** and in close proximity to a fused power source. It should be easily accessible for routine maintenance.

If ERV/HRV is installed independent of a forced-air system, unit should be located near the center of the air distribution system. If ERV/HRV is installed in conjunction with a forced-air system, unit should be located next to (or close to) the indoor equipment.

## COMPONENT DESCRIPTION

The following listed items are components of ERVBBSHA (See Fig. 4).

1. Exhaust-air connected to outdoor air exhaust hood.
2. Fresh-air intake connected to outdoor air inlet hood.
3. Fresh-air supply from ERV connected to return-air duct of forced-air system.
4. Mechanical filters trap dust contained in the air.
5. Energy recovery core is a cross-flow type. The core transfers heat between the 2 air streams.
6. Blowers bring in fresh-air from outside and exhaust stale-air to outside.
7. Electronic control circuit ensures proper unit operation.
8. Stale air return from building connected to return-air duct system.

ERV ports on side (bottom view)

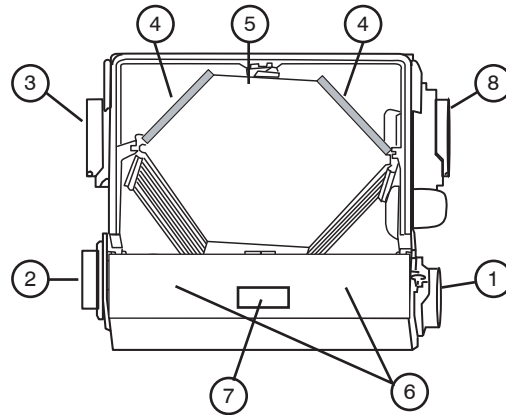


Fig. 4 - Conventional Horizontal Unit

A05263

See Fig. 5 for terminal connector block for wiring wall and timer controls.

## UNIT INSTALLATION

### CAUTION

#### UNIT DAMAGE HAZARD

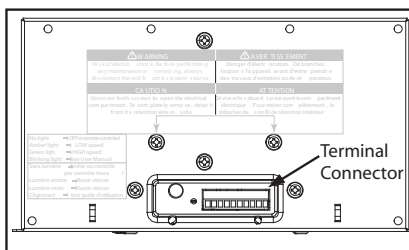
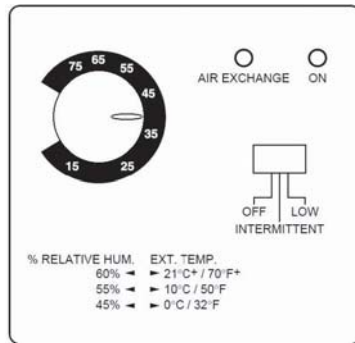
Failure to follow this caution may result in equipment damage or improper operation.

Do not install ERV/HRV in a corrosive or contaminated atmosphere.

### Mount Unit

The ERV/HRV can be suspended from floor joists using chains and 4 springs. Attach metal hanging bracket to all 4 sides of cabinet. (See Fig. 6.) The unit may be installed on a shelf if an isolation pad is provided to dampen vibration. Unit should always be installed as level as possible.

### WALL CONTROL



### CONTROL CONNECTOR

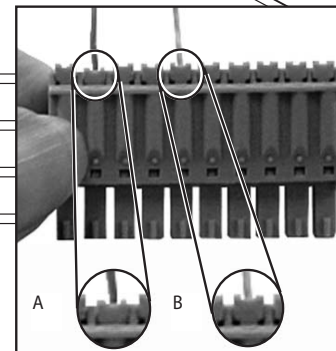
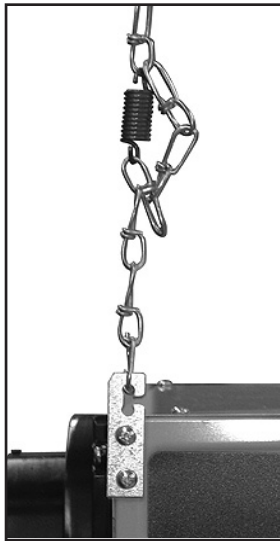


Fig. 5 - Control Connector

A07418



**Fig. 6 - Chain Spring Installation**

A05331

## Independent System Application

In the absence of a forced-air system and a typical duct system layout, the ERV/HRV can be applied as an independent or stand alone unit. To ensure comfort, this type of application involves running both fresh-air and return-air registers (or stale-air pickup registers) throughout the home.

Fresh-air registers are normally located in bedrooms, dining room, living room, and basement. It is recommended that registers be placed 6 to 12" (152 to 305mm) from the ceiling on an interior wall and airflow directed toward ceiling. If registers are floor installed, airflow should be directed toward the wall.



## WARNING

### CARBON MONOXIDE POISONING HAZARD

Failure to follow this warning could result in personal injury or death.

Do not install return-air registers (or stale-air pickup registers) in same room as gas furnace or water heater.

Return-air (or stale-air pickup registers) are normally located to draw from kitchen, bathroom, basement, or other rooms where stale-air can exist.

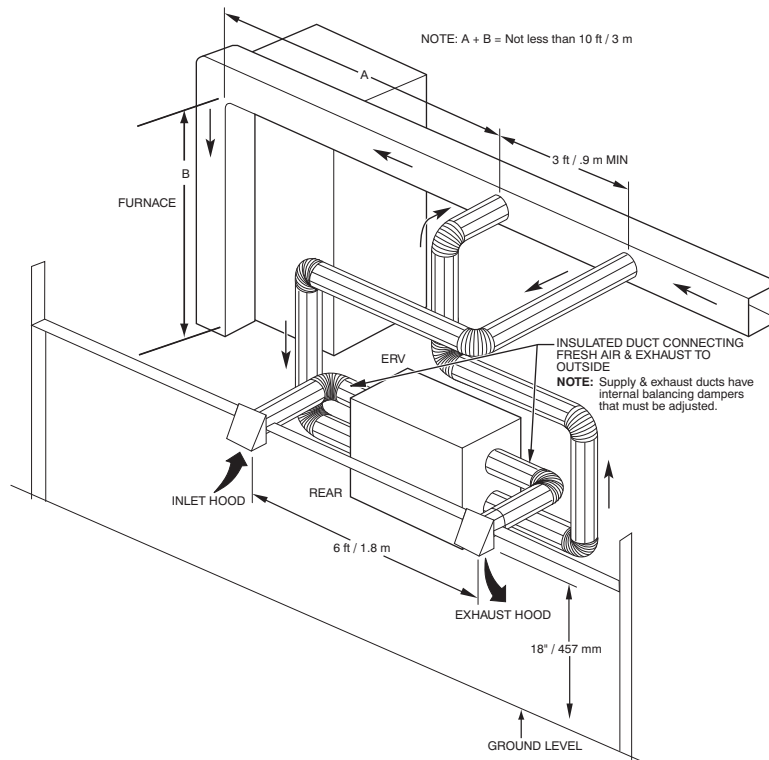
Proper size and type of registers must be used to minimize pressure drop. The velocity of airflow through register should not be above 400 ft (122m) per minute.

Maximum length of duct for the system should be designed according to the highest speed of the unit. Refer to specifications listed in unit Product Data Digest for ventilation capacities.

## Forced-Air Application

Most ERV/HRV applications will be installed in conjunction with new or existing forced-air system. To operate properly, the fresh-air supply and stale-air return from ERV/HRV connect directly to return-air duct system. This is how the ERV/HRV distributes fresh air and removes stale air from inside of building (See Fig. 7). For these installations, furnace or fan coil blower must be interlocked and operate continuously whenever ERV/HRV is energized. See Fig. 17 for interlock wiring detail.

**NOTE:** The fresh air from ERV/HRV is introduced into return-air duct at a point no less than 6 ft (1.8m) upstream of furnace or fan coil. This connection should be direct (See Fig. 7). This is to allow incoming fresh-air to mix before entering indoor equipment.



**Fig. 7 - Exhaust Ventilation**

A07282

## Connect Ducts to ERV/HRV

### ⚠ CAUTION

#### PROPERTY DAMAGE HAZARD

Failure to follow this caution may result in minor property damage from sweating duct or loss of unit efficiency and capacity.

If ERV/HRV duct work is installed in an unconditioned space, insulated flexible duct is required.

**Insulated flexible duct is required on both fresh-air inlet and exhaust-air outlet ducts connecting to exterior wall.** When using insulated flexible duct, the vapor barrier of the flexible ducts must be taped very tight to prevent condensation problems. To reduce pressure drop, stretch the flex duct and support it in a proper manner to avoid reduced airflow.

When connecting the ERV/HRV to a return-air duct system, insulated flexible duct can be used. However, when metal or rigid ducts are applied use approximately 18" (457mm) of flexible duct at ERV/HRV ports for fresh-air supply, and stale-air return. When using metal duct from fresh-air supply to system duct work, the metal duct should be insulated. (See Fig. 8.) This can act as a silencer when connecting ducts to return-air duct system. This should eliminate transmission of noise or vibration from unit to main duct system.

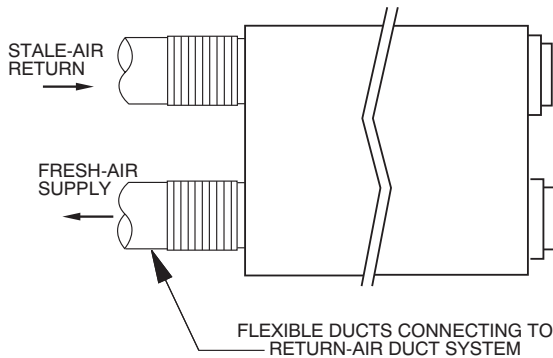


Fig. 8 - Flexible Duct Fit-Up

A08102

## Locate and Install Exterior Hoods

**IMPORTANT:** To prevent condensation problems, insulated flexible ducts are required on both fresh-air inlet and exhaust-air outlet ducts connecting between ERV/HRV and exterior wall.

Fresh-air intake and stale-air exhaust must be separated by at least 6 ft (1.8m). Fresh-air intake must be positioned at least 10 ft (3m) from nearest dryer vent, furnace exhaust, driveway, gas meter, or oil fill pipe. Fresh-air intake must be positioned as far as possible from garbage containers and potential chemical fumes. When possible, it is advised to locate the intake and exhaust hoods on same side of house or building. The intake and exhaust hoods should never be located on interior corners or in dead air pockets (See Fig. 7). Both intake and exhaust hoods must be 18" (457mm) from ground and at least 12" (305mm) above anticipated snow level.

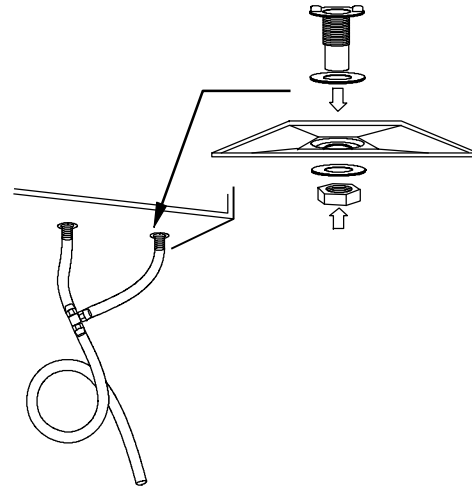
After selecting proper hood locations, make appropriate size hole through exterior wall, pass flexible duct through hole and insert hood tube into duct. Tape duct vapor barrier tightly around hood tube and insert assembly back into wall and fasten securely.

## Condensate Drain

(For ERV, skip this step and continue to the next step.)

To connect condensate drain, proceed as follows:

1. Punch out holes in foam insulation and door, then insert sleeved grommets into bottom of unit using the gasket washer and nut. (See Fig. 9.)
2. Cut two sections of plastic tubing, about 12" / 305mm long and attach them to each drain.
3. Join the two short sections of plastic tubing to the "T" connector and the main tube as shown.
4. Make a loop in the tubing below the "T" connector to create a trap to prevent sewer gases from entering the ventilation system. (See Fig. 9.)
5. Connect unit drain to building's main drain. Provide slight slope from unit for run-off.



A99268

Fig. 9 - Condensate Drain With Loop Trap (HRV Only)

## WALL CONTROL

### Types

Four remote wall control options are available:

1. Basic Control (see Table 1).
2. OneTouch Control
3. Standard Control (includes dehumidistat)
4. Latent Control (includes humidistat for use with ERV's only)

Table 1 – Basic Control

MODE	OPERATION	DAMPER POSITION	FAN SPEED
Off	Off	Closed to outside	Off
Low	Air exchange with outside	Open to outside	Low
Intermittent	Air exchange with outside	Open to outside	Low
High	Air exchange with outside	Open to outside	High

Table 2 – Recommended Humidity Levels

OUTSIDE TEMPERATURE	DOUBLE-PANE WINDOWS	TRIPLE-PANE WINDOWS
50°F / 10°C	55%	65%
32°F / 0°C	45%	55%
14°F / -10°C	35%	45%
-4°F / -20°C	30%	45%
-22°F / -30°C	25%	35%

### Location

The Standard Control and the Latent Control sense humidity and not temperature. They must be located in an area where they will continually monitor fresh air circulating within the home. Install ERV/HRV wall controls as close as possible to main system

thermostat and follow same guidelines as installing a thermostat (locate approximately 5 ft (1.5m) above floor, mount on an inside partitioning wall, etc.)

## Wiring

Remove top cover assembly from wall control and pass thermostat wire through hole located on back of control before attaching to wall. Connect Y, R, G, and B (yellow, red, green, and black) between wall control and ERV/HRV connector following color code. (See Fig. 5 and 10.) Replace top cover assembly.

**NOTE:** ERV/HRV wall control and circuit board operate on 12VDC.

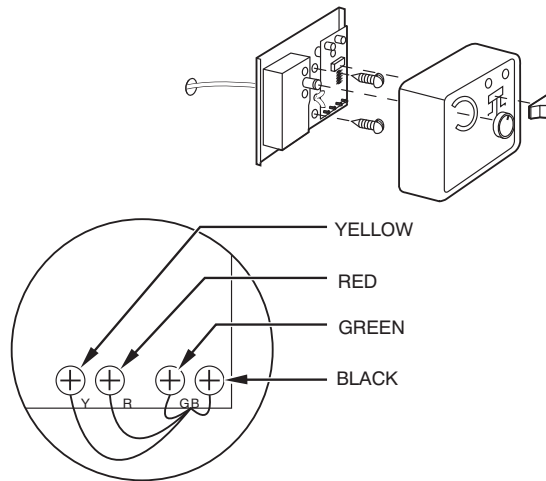


Fig. 10 - Typical Wall Control

A98383

## Operation

The Standard and Latent wall controls have 4 basic modes of operation, OFF, LOW, HIGH, and INTERMITTENT. Be sure that all modes of operation are fully functional. See Table 1 indicating standard control operation.

1. With switch off, ERV/HRV is inoperative and the LED is out.
2. With switch on LOW, ERV/HRV continuously exchanges air with outside. If control is satisfied, blower will run in low speed, otherwise, blower will run on high speed. The LED is illuminated all the time.
3. With switch on INTERMITTENT, the ERV/HRV exchanges air with outside on high-speed blower, and unit shuts down when control is satisfied. The ON LED is illuminated all the time, and AIR EXCHANGE LED is illuminated only when unit is running.

## Humidity Selector

The humidity selector is a built-in control designed to properly control the level of humidity in the house during the winter and summer months. This control helps avoid condensation problems in upper northern regions where indoor humidity is a problem during the winter season.

**NOTE:** This control is not to be confused with a dehumidistat used during the summer months to control high relative indoor humidity.

Table 2 recommends humidity levels to avoid condensation.

## OneTouch Control

The OneTouch Control can be used as the primary wall control for the ERV/HRV. This control will step through the modes of operation with consecutive presses of the button. The LED indicates which mode is currently selected, Off, Intermittent, Low, or High.

**NOTE:** OneTouch Control does not have a humidity selector.

**NOTE:** OneTouch Intermittent mode exchanges air on low speed for 20 minutes per hour.

## Latent Control

**NOTE:** For Latent Controls used with ERV;s, to ensure highest degree of humidity control in cooling season, the INTERMITTENT mode should be used.

## Integrated Control

All units are equipped with an integrated control, located under the unit, in front of the electrical compartment. Use the push button (1) to control the unit. The LED (2) will then shows on which mode the unit is in. Integrated Control overrides Wall Control function. When LED is off, ventilator responds to Wall Control command. See Fig. 11.

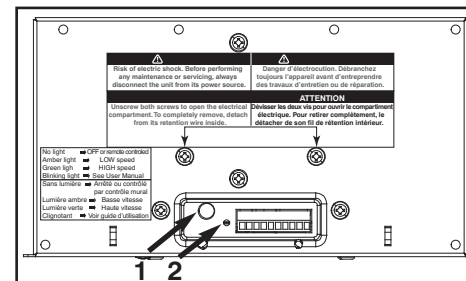


Fig. 11 - Integrated Control

A07260

Refer to table below to see how to operate the unit using its integrated control.

PRESS ON PUSH BUTTON	LED COLOR	RESULTS
Once	Amber	Unit is on Low Speed
Twice	Green	Unit is on High Speed
Three Times	No Light	Unit is OFF

If a problem occurs during the unit operation, its integrated control LED (2) will blink. The color of the blinking light depends on the type of error detected. Refer to Troubleshooting for further details.

**NOTE:** The ERV/HRV may be controlled using the Evolution system control. The ERV/HRV may be connected using either a NIM or a 4-Zone Damper Module. See the appropriate instructions if using the NIM or a 4-Zone Damper Module for connection instructions.

The Evolution system control will simultaneously control the ERV/HRV and the indoor blower.

Push Button Timers may be used and are connected to the ERV/HRV. However, the Evolution system should be set to continuous fan to ensure that the fresh air is circulated in the home. In a Zoned System, at least one zone should be set to continuous fan.

## OPERATING THE ERV/HRV WITH THE EVOLUTION CONTROL

The ventilator has four settings in heating mode and three settings in cooling mode.

### Heating:

**AUTO** - the ventilator selects the speed based on indoor humidity and outdoor temperature. It may cycle on/off every 30 minutes depending on humidity and outside temperature.

**LOW** - low speed all of the time.

**HIGH** - high speed all of the time.

DEHUM - will only turn on if humidity is 3% over setpoint. The speed is determined by indoor humidity and outdoor temperature.

### Cooling:

AUTO - the ventilator selects the speed based on indoor humidity and outdoor temperature. It may cycle on/off every 30 minutes depending on humidity and outside temperature.

LOW - low speed all of the time.

HIGH - high speed all of the time.

If the fan speed is set to Auto and the ventilator wants to run, the fan speed will run at High continuous speed. Otherwise, the fan will stay at the chosen continuous fan speed.

### BOOT SEQUENCE

The unit boot sequence is similar to a personal computer boot sequence. Each time the unit is plugged after being unplugged, or after a power failure, the unit will perform a 30-second booting sequence before starting to operate. During the booting sequence, the integrated control LED will light GREEN or AMBER for 5 seconds, and then will shut off for 2 seconds. After that, the LED will light RED for the rest of the booting sequence. During this RED light phase, the unit is checking and resetting the motorized damper position.

Once the motorized damper position completely set, the RED light turns off and the booting sequence is done.

**NOTE:** No command will be taken until the unit is fully booted.

## ELECTRICAL CONNECTIONS

### 115-VAC Wiring

The ERV/HRV operates on 115VAC. It comes with a power cord attached to unit and ready to plug into a fused outlet. Unit must be grounded for proper operation.

All electrical connections must comply with National and Local Electrical Codes, or other ordinances that might apply.



## WARNING

### ELECTRICAL SHOCK / FIRE HAZARD

Failure to follow this warning could result in personal injury, death and/or property damage.

Do not use an extension cord as a power source for operating the ERV/HRV.

### 12VDC Wiring

The ERV/HRV circuit board, wall control, and accessories operate on 12VDC. See Wall Control section, item Wiring and Fig. 5 and 10 for more information.

## ACCESSORIES

### 20 Minute Timer

A push button timer can be used to override the wall control and put the ERV/HRV into high speed for 20 minutes. Connect switches in parallel and connect leads to ERV/HRV terminals I, OC, and OL (See Fig. 12). Push button locations are ideal in special activity areas, such as, bathroom, or kitchen, where high-speed exhaust operation is needed for a short period of time.

**NOTE:** The 20 minute timer will not function properly unless ERV/HRV wall control is applied and working correctly. Timing function is internal to electronic circuit board, it is activated by a momentary contact between OC and OL. The I connection is to illuminate the push button. The maximum number of push button timers that can be applied is 5.

### 60 Minute Adjustable Timer

A 60 minute adjustable timer can also be used to override wall control and put HRV into high-speed operation for a select amount of time. Connect timer in parallel with push button timers, or to ERV/HRV terminals OC and OL. (See Fig. 12.)

The 60 minute timer will provide a minimum of 10 minutes, and a maximum of 60 minutes of ventilation at high speed.

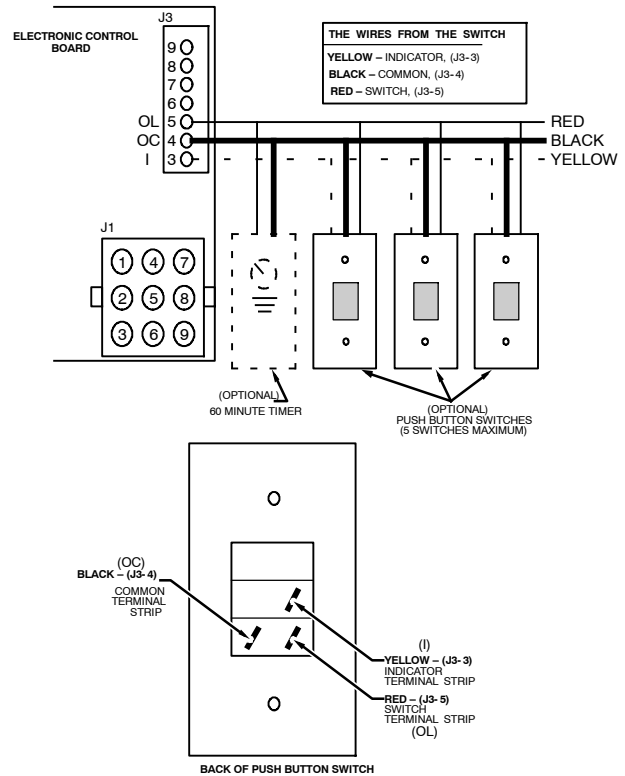


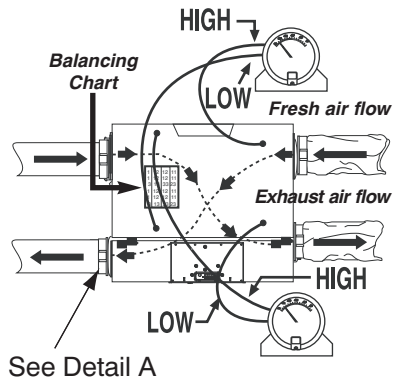
Fig. 12 - Push Button Timer Wiring Layout

A98386

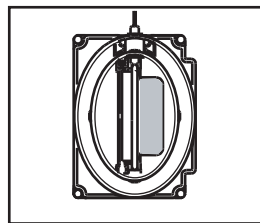


## BALANCING ERV/HRV

Balancing intake and exhaust airflow is very important for proper system operation and optimum performance when applying an ERV/HRV. Unit balancing prevents a positive and/or negative pressure within the home. Balancing the ERV/HRV is done by applying magnehelic gauge and using the balancing dampers at the fresh air intake and stale air exhaust ducts. (See Fig. 13.)



DETAIL A



Port with integrated  
balancing damper  
Top View

Fig. 13 - Balancing ERV/HRV

A07261

Airflow is determined by temporarily connecting a magnehelic gauge to the pressure taps on ERV/HRV. (See Fig. 14.) Balancing chart is located on unit door.

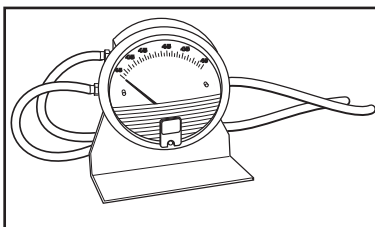


Fig. 14 - Magnehelic Gauge

A98400

If supply-air from outside is greater than exhaust-air from the house, an imbalance can result over pressurizing the home. If exhaust-air is greater than supply-air, combustion appliances may backdraft, bringing exhaust fumes into the house. A balanced condition will ensure optimum performance, provide satisfied customers, and avoid expensive callbacks.

Before proceeding with balancing, all windows, doors, and fireplace flues should be tightly closed. No exhaust systems such as range top exhausts, dryer exhaust, fume hoods, bath or roof fans should be in operation. The forced-air furnace (if used for circulation) should be operating in continuous fan mode for normal operating speed.

### Balancing Procedure

#### Step 1 — Set the unit to high speed.

Make sure that the furnace/air handler blower is ON if the installation is in any way connected to the ductwork of the cold air return. If not, leave furnace/air handler blower OFF. If the outside temperature is below 32°F (0°C), make sure the unit is not running in defrost while balancing. (By waiting 10 minutes after plugging the unit in, you are assured that the unit is not in a defrost cycle.)

#### Step 2 — Magnehelic gauge placement.

Place the magnehelic gauge on a level surface and adjust it to zero.

#### Step 3 — Connect tubing from gauge to EXHAUST air flow pressure taps.

Be sure to connect the tubes to their appropriate high/low fittings. (See Fig. 13.) If the gauge drops below zero, reverse the tubing connections.

**NOTE:** It is suggested to start with the exhaust air flow reading because the exhaust has typically more restriction than the fresh air, especially in cases of fully ducted installations or source point ventilation. Place the magnehelic gauge upright and level. Record equivalent AIR FLOW of the reading according to the balancing chart.

#### Step 4 — Move tubing to FRESH air flow pressure taps.

Adjust the fresh air balancing damper until the fresh air flow is approximately the same as the EXHAUST air flow. If fresh air flow is less than exhaust air flow, then go back and adjust the exhaust balancing damper to equal the fresh air flow. (See Fig. 13.)

#### Step 5 — Secure both dampers thumb screw in place with tape.

#### Step 6 — Record air flow information.

Write the required air flow information on a label and stick it near the unit for future reference (date, maximum speed air flows, your name, phone number and business address).

**NOTE:** The unit is considered balanced even if there is a difference of  $\pm 10$  CFM (or  $\pm 5$  l/s or  $17 \text{ m}^3/\text{h}$ ) between the two air flows.

### Balancing Dampers

Balancing dampers (sometimes called butterfly dampers) are located in fresh-air intake and stale-air exhaust of the ERV/HRV. (See Fig. 13.) Insulating over these dampers is strongly recommended after balancing is complete to prevent condensation problems.

## VENTILATION EVALUATION

### ⚠ CAUTION

#### UNIT DAMAGE HAZARD

Failure to follow this caution may result in reduced unit efficiency, capacity or unit life.

DO NOT use HRV during construction of a house or when sanding drywall. This type of dust may damage system.

### Ventilator Sizing

Tables 3 and 4 should be used to determine the required airflow for a home. These guidelines are taken from ASHRAE 62.2-2004.

**Table 3 – Ventilation Air Requirements, cfm**

FLOOR AREA (ft <sup>2</sup> )	BEDROOMS				
	0–1	2–3	4–5	6–7	>7
<1500	30	45	60	75	90
1501–3000	45	60	75	90	105
3001–4500	60	75	90	105	120
4501–6000	75	90	105	120	135
6001–7500	90	105	120	135	150
>7500	105	120	135	150	165

**Table 4 – Ventilation Air Requirements, L/s**

FLOOR AREA (m <sup>2</sup> )	BEDROOMS				
	0–1	2–3	4–5	6–7	>7
<139	14	21	28	35	42
139.1–279	21	28	35	42	50
279.1–418	28	35	42	50	57
418.1–557	35	42	50	57	64
557.1–697	42	50	57	64	71
>697	50	57	64	71	78

## CONTROL BOARD OPERATION

### Defrost

The ERV/HRV continually monitors the outside air temperature. If the outside air is at or below 23°F (-5°C), the ERV/HRV will initiate a defrost cycle by closing the outside air damper and recirculating warm indoor air through the heat recovery core. This happens every 32 minutes with a 6 minute defrost cycle. During this process, core is defrosted without the use of electric strip heat. At 5°F (-15°C), unit will defrost for 6 minutes every 32 minutes. At -17°F (-27°C), the unit will sense a need to defrost every 20 minutes with a 6 minute cycle. See the Troubleshooting section for a control logic explanation.

### Off and Intermittent/Off Mode

When ERV/HRV is Off, K1 relay is open, and K5 relay is energized which closes outside air damper.

### High-Speed Air Exchange

When high-speed air exchange occurs, K1 and K2 relays are energized and K5 relay is de-energized. This opens low-speed contacts, and closes high-speed contact on K2 relay. This also opens contact on K5 relay which opens outside air damper. Then, 115VAC is applied between orange and gray wires on Molex plug (pins 1 and 6) and blower motor runs in high-speed operation.

### Low-Speed Air Exchange

When low-speed air exchange occurs, K1 Relay is energized which closes the contacts. K2 and K5 relays are de-energized. This keeps low-speed contacts closed and high-speed contacts open on K2 relay, and opens outdoor air damper. 120VAC is applied

between Red and Gray wires on Molex plug (pins 1 and 4) and blower motor runs in low-speed operation.

## CARE AND MAINTENANCE

### Door

ERV/HRV door can be removed by unlatching brief case style latches, then slide door to the right and remove it from hinges. Door must be in place and secured shut for proper operation.

### Filter

Filters in ERV/HRV are washable and should be cleaned every 3 months. Use a vacuum cleaner to remove heaviest portion of accumulated dust, then wash in lukewarm water. Allow filter to completely dry before reinstalling. A dirty air filter will cause excessive strain on blower motor. Never operate unit without a filter. Vacuum out debris.

In addition, regularly check and clean screens on exterior intake and exhaust hoods when necessary.

### ⚠ CAUTION

#### UNIT COMPONENT DAMAGE HAZARD

Failure to follow this caution may result in unit component damage.

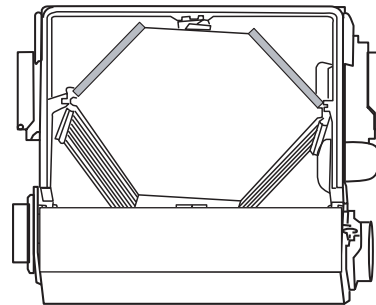
DO NOT clean filters in a dishwasher and DO NOT dry them with a heating appliance or permanent damage will result.

### Blower Motor and Wheel

ERV/HRV blower motors are factory lubricated for life. Lubricating bearings is not recommended. However, inspect and clean any accumulated dirt and grease from blower motor and wheel annually.

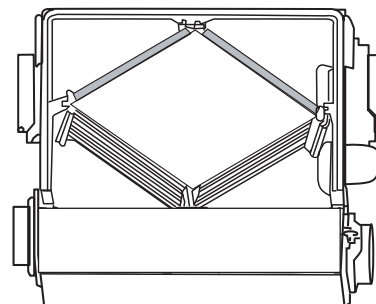
### Cleaning the Core

ERV is equipped with a special energy recovery core which utilizes a special membrane and allows transfer of sensible and latent energy. The core should always be vacuumed only every 3 months to remove dust and dirt that could prevent transfer of energy. (See Fig. 15 and 16.)



A05347

**Fig. 15 - ERV Ports on Side (Bottom View)**



A05348

**Fig. 16 - HRV Ports on Side (Bottom View)**



**NOTE:** The core should only be serviced when outdoor temperature is 60°F to 75°F (16°C to 24°C) and it is dry.



## CAUTION

### UNIT COMPONENT DAMAGE HAZARD

Failure to follow this caution may result in equipment damage or improper operation.

DO NOT use water to clean core or damage will result. In addition, before servicing or removing the core inspect the edges to see if they appear soft (or slightly expanded). This can be normal and due to moisture in the air. DO NOT handle or service core until it is dry or air passages can become damaged and/or closed.



## WARNING

### ELECTRICAL SHOCK HAZARD

Failure to follow this warning could result in personal injury or death.

Before installing or servicing system, always turn off main power to system. There may be more than 1 disconnect switch.



## CAUTION

### CUT HAZARD

Failure to follow this caution may result in personal injury.

Sheet metal parts may have sharp edges or burrs. Use care and wear appropriate protective clothing and gloves when handling parts.

## TROUBLESHOOTING

**NOTE:** Reference Table 5 Troubleshooting Chart

This can be a quick guide in resolving unit problems. It is also recommended to review and understand Wall Control Board Operation and Care and Maintenance sections before continuing.

**NOTE:** If there is a short circuit or an open circuit at thermistor, CPU will go into a 5 minute defrost cycle every 20 minutes. This feature is not there on older board versions with 3 pin jumpers.

### Override Test

To use override test function, a thermistor must be connected to the control board. Unit must not be in defrost mode during an override test.

#### High Speed

1. Disconnect ERV/HRV from 115VAC.
1. Unplug wall control wires at control module terminal block inside ERV/HRV.
2. Plug ERV/HRV back to 115VAC.
3. Attach a wire across J3-8 and J3-9 (B and G) on control module terminal block.
4. Close door, this will initiate a high-speed exchange.

#### Low Speed

1. Unplug ERV/HRV from 115VAC.
2. Disconnect wall control wires at control module terminal block inside ERV/HRV.
3. Plug ERV/HRV back to 115VAC.
4. Connect a 3.0 K ohm resistor between B and G on control module terminal block.
5. Close door, this will initiate a low-speed exchange.

#### Blower Speed Selection

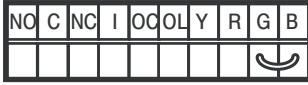
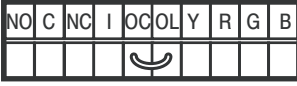
Three-speed blowers are factory connected to electronic control board on HIGH- and LOW-speed taps of blowers. Installer can easily change low-speed tap to medium-speed tap so electronic control will select between high and medium speed. Connections can be changed at motor location.

To change low speed to medium speed, proceed as follows:

1. Unplug unit from 115VAC.
2. Locate blower assembly.
3. Locate red wire and blue wire coming from blower assembly.
4. Unplug red wire from quick connect.
5. Unplug protecting cap quick connection from blue wire and put on red wire coming from blower. The cap is a safety insulator.
6. Connect red wire of main harness to blue wire.
7. Replace wires.

If the integrated control LED of the unit is flashing, this means the unit sensors detected a problem. See the table below to know where on the unit the problem occurs.

**Table 5 – Troubleshooting**

LED flashes GREEN.	Thermistor error.	Reference Table 6 for proper temperature vs. resistance relationship. If thermistor is defective, replace the entire port assembly (fresh air from outside port).
LED flashes RED.	The door is open and the unit is not unplugged.	Close the door and press once on the integrated control push button to reset the unit.
	Exhaust motor error.	Go to Problem 5 below.
LED flashes AMBER.	Damper error.	Go to Problem 6 below.
<b>Problem:</b>	<b>Possible causes:</b>	<b>You should try this:</b>
1. Unit does not work.	<ul style="list-style-type: none"> <li>The circuit board may be defective.</li> </ul>	<ul style="list-style-type: none"> <li>Unplug the unit. Disconnect the main control and the optional control(s) (if need be). Jump G and B terminals. Plug the unit back and wait about 10 seconds. If the motors run on high speed and the damper opens, the circuit board is not defective.</li> </ul>
		
2. The damper actuator does not work.	<ul style="list-style-type: none"> <li>The damper actuator or the integrated damper port mechanism may be defective.</li> <li>The circuit board may be defective.</li> </ul>	<ul style="list-style-type: none"> <li>Unplug the unit. Disconnect the main control and the optional controls(s) (if need be). Wait 10 seconds and plug the unit back. Check if the damper opens. If not, use a multimeter and check for 24VAC on J12-1 and J12-2 (in electrical compartment). If there is 24VAC, replace the entire port assembly.</li> <li><b>NOTE:</b> It is normal to experience a small delay (7-8 seconds) before detecting the 24VAC signal at starting-up. This signal will stay during 17-18 seconds before disappearing.</li> <li>If there is no 24VAC, replace the circuit board.</li> </ul>
3. The wall control does not work OR its indicator flashes.	<ul style="list-style-type: none"> <li>The wires may be in reverse position.</li> <li>The wires may be broken.</li> <li>The wire in the wall OR the wall.</li> </ul>	<ul style="list-style-type: none"> <li>Ensure that the color coded wires have been connected to their work OR its indicator flashes. appropriate places.</li> <li>Inspect every wire and replace any that are damaged.</li> <li>Remove the wall control and test it right beside the unit using another control may be defective. shorter wire. If the wall control works there, change the wire. If it does not, change the wall control.</li> </ul>
4. The dehumidistat does not work OR the 20-minute. push-button timer does not work OR its indicator light does not stay on.	<ul style="list-style-type: none"> <li>The wires may be in reverse position.</li> <li>The dehumidified or push button may be defective.</li> </ul>	<ul style="list-style-type: none"> <li>Ensure that the color coded wires have been connected to their appropriate places.</li> <li>Jump the OL and OC terminals. If the unit switch to high speed, remove the dehumidistat or push button and test it right beside the unit using another shorter wire. If it works here, change the wire. If it doesn't, change the dehumidistat or the push button.</li> </ul>
		
5. The supply and/or exhaust motor do not work.	<ul style="list-style-type: none"> <li>The circuit board may be defective.</li> <li>The motor(s) may be defective.</li> </ul>	<ul style="list-style-type: none"> <li>Press on the integrated control push button until the unit turn on low speed (the LED will light AMBER). Using a multimeter, check the voltage on J4-1 and J4-2 (for supply motor), and on J5-1 and J5-2 (for exhaust motor). The reading must be <math>\pm 68VAC</math>. Then set the unit on high speed by pressing on the integrated control 1 more time (the LED will light GREEN). Using a multimeter, check the voltage on J4-1 and J4-2 (for supply motor), and on J5-1 and J5-2 (for exhaust motor). The reading must be <math>\pm 120VAC</math>. If all the readings correspond to the right voltage values, the circuit board is not defective. If one or both readings are different, change the circuit board.</li> <li>Using a multimeter, check the ohms value on each motor connectors. Black motors values: For BLUE and BLACK motor wires, the right value is <math>\pm 55</math> ohms. For BLUE and BROWN motor wires, the right value is <math>\pm 35</math> ohms. For BROWN and BLACK motor wires, the right value is <math>\pm 89</math> ohms. Aluminum motors values: For BLUE and BLACK motor wires, the right value is <math>\pm 51</math> ohms. For BLUE and BROWN motor wires, the right value is <math>\pm 47</math> ohms. For BROWN and BLACK motor wires, the right value is <math>\pm 98</math> ohms. If the ohms values are the same, the motor is not defective. Replace the motor capacitor.</li> </ul>
6. The defrost cycle does not work (the fresh air duct is frozen OR the fresh air distributed is very cold. (See Table 7 for Defrost Cycle Timing.)	<ul style="list-style-type: none"> <li>Ice deposits may be hindering the damper operation.</li> <li>The damper rod or the port damper itself may be broken.</li> <li>The damper actuator or circuit board may be defective.</li> </ul>	<ul style="list-style-type: none"> <li>Remove the ice.</li> <li>Inspect these parts and replace if necessary.</li> <li>See Problem 2.</li> </ul>
7. The integrated control push button does not work.	The 30-second boot sequence is not completed.	See Boot Sequence.

**Table 6 – Temperature / Ohm Relationship**

Temp. (°F / °C)	Resistance (Ohms)
-9 / -23	78330
-8 / -22	74610
-6 / -21	71100
-4 / -20	67770
-2 / -19	64570
-.4 / -18	61540
1 / -17	58680
3 / -16	55970
5 / -15	53410
7 / -14	50980
9 / -13	48680
10 / -12	46500
12 / -11	44430
14 / -10	42470
16 / -9	40570
18 / -8	38770
19 / -7	37060
21 / -6	35440
23 / -5	33900
25 / -4	32440
27 / -3	31050
28 / -2	29730
30 / -1	28480
32 / 0	27280
34 / 1	26130
36 / 2	25030
37 / 3	23990
39 / 4	23000
41 / 5	22050
43 / 6	21150
45 / 7	20300
46 / 8	19480
48 / 9	18700
50 / 10	17960
52 / 11	17240
54 / 12	16560
55 / 13	15900
57 / 14	15280
59 / 15	14690
61 / 16	14120
63 / 17	13580
64 / 18	13060
66 / 19	12560
68 / 20	12090
70 / 21	11630
72 / 22	11200
73 / 23	10780
75 / 24	10380
77 / 25	10000
79 / 26	9632
81 / 27	9281
82 / 28	8944
84 / 29	8622
86 / 30	8313
88 / 31	8014
90 / 32	7728
91 / 33	7454
93 / 34	7192
95 / 35	6940
97 / 36	6699
99 / 37	6467
100 / 38	6245

**Table 7 – Defrost Cycle**

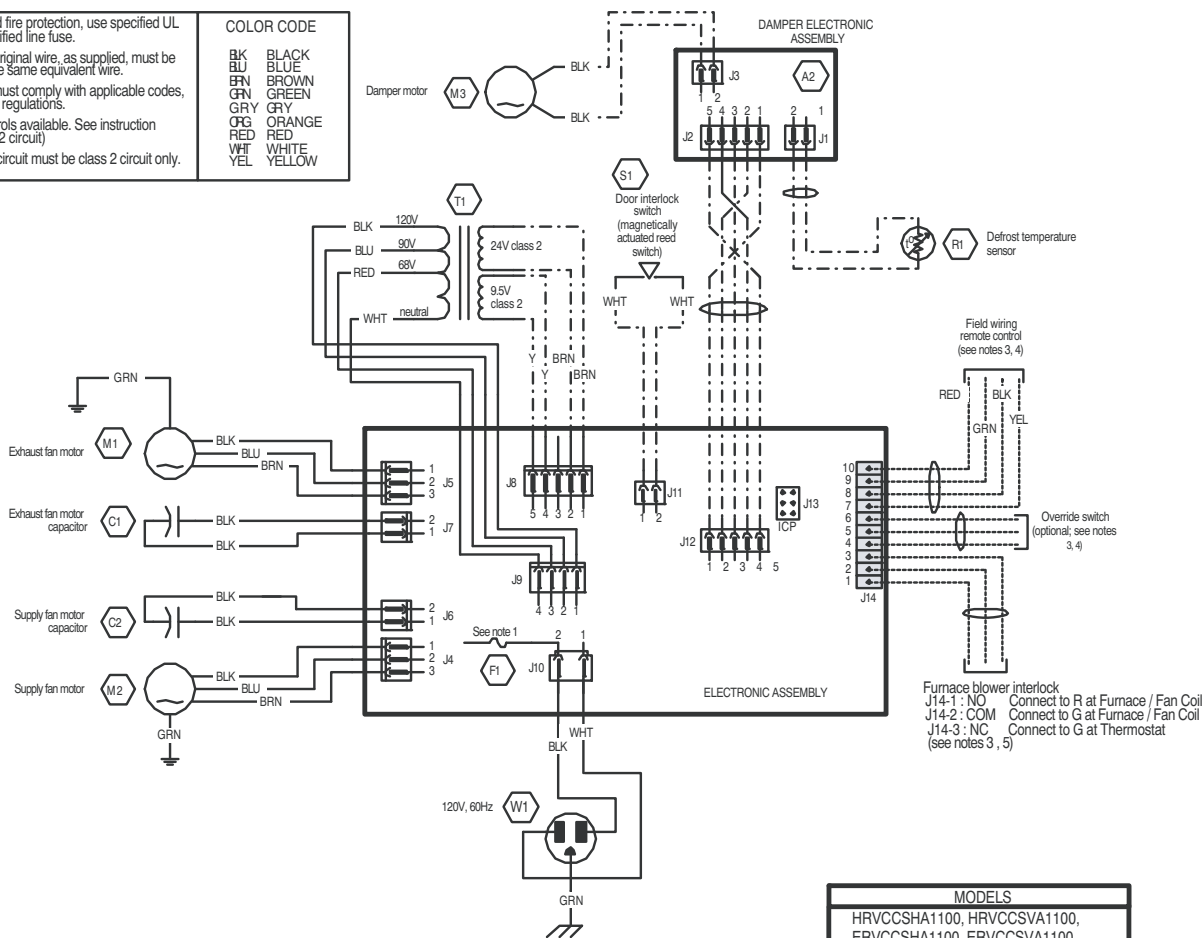
HRV DEFROST CYCLES		
Outside Temp °F / °C	Defrosting (minutes)	Operation time (min.) between each defrost cycle
23 to -17°F -5 to -27°C	7	25
-17°F and less -27°C and less	10	22
ERV DEFROST CYCLES		
Outside Temp °F / °C	Defrosting (minutes)	Operation time (min.) between each defrost cycle
23 to -17°F -5 to -27°C	9	23
-17°F and less -27°C and less	10	22

# CONNECTION DIAGRAM

	Line voltage factory wiring
	Class 2 low voltage factory wiring
	Class 2 low voltage field wiring

1. For continued fire protection, use specified UL listed/CSA Certified line fuse.
2. If any of the original wire, as supplied, must be replaced, use the same equivalent wire.
3. Field wiring must comply with applicable codes, ordinances and regulations.
4. Remote controls available. See instruction manual. (class 2 circuit)
5. Furnace fan circuit must be class 2 circuit only.

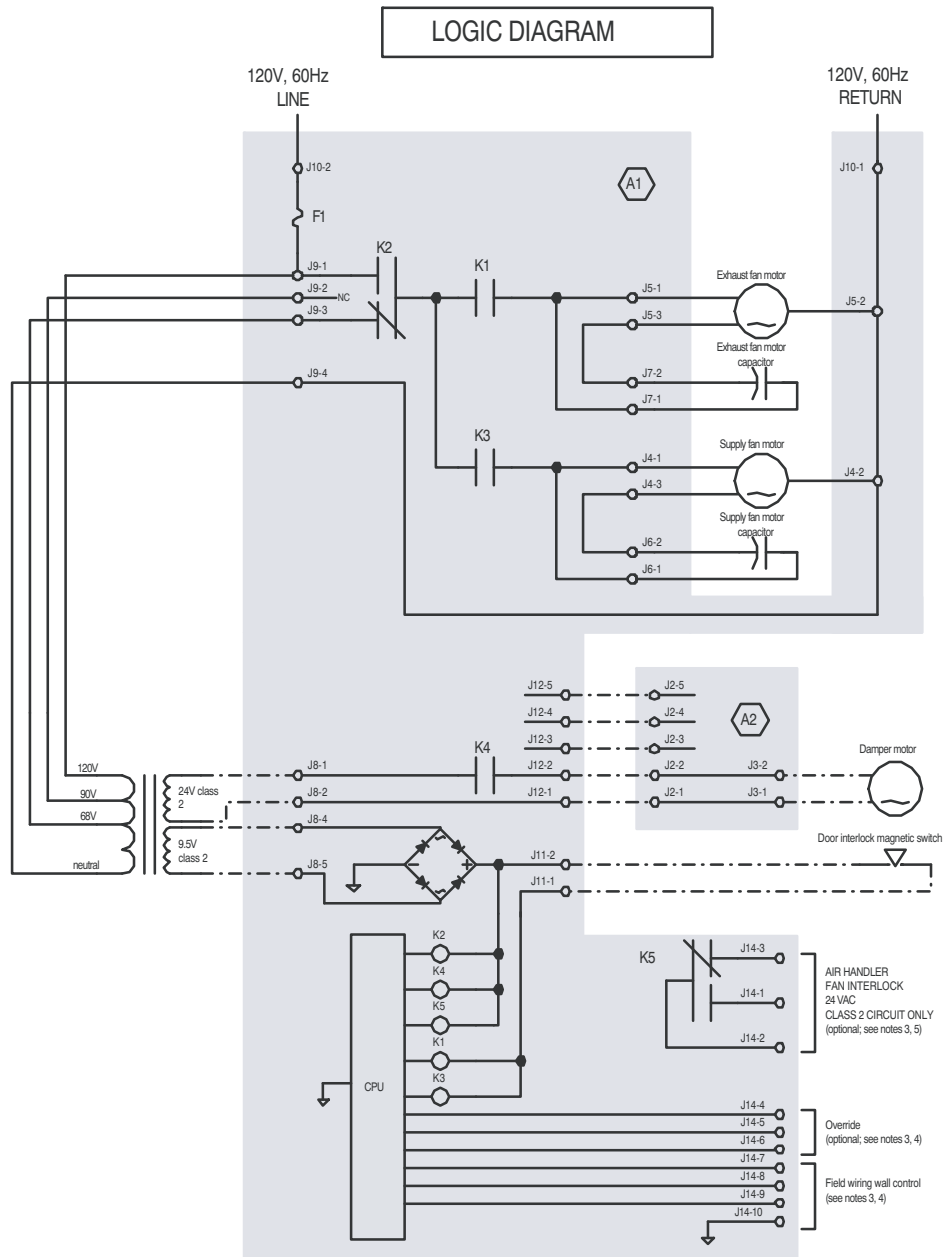
COLOR CODE	
BLK	BLACK
BLU	BLUE
BRN	BROWN
GRN	GREEN
GRY	GRAY
ORG	ORANGE
RED	RED
WHT	WHITE
YEL	YELLOW



K5	K2	K3	K1	MODE	M1 "Supply"	M2 - "Exhaust"	DAMPER
0	0	0	0	OFF	OFF	OFF	Closed
1	0	1	1	Exchange low speed	LO	LO	Opened
1	1	1	1	Exchange high speed	HI	HI	Opened
1	1	1	0	Circulation high speed	HI	OFF	Closed
1	1	1	0	Defrost	HI	OFF	Closed

Fig. 17 - ERV / HRV Wiring Diagram

A07118



**ERV / HRV**

**Fig. 18 - ERV / HRV Wiring Diagram**

A07417